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Visual attention to alcohol labels: an exploratory eye-tracking experiment

Atención visual hacia el etiquetado de bebidas alcohólicas: un estudio exploratorio basado en eye-tracking

Carlos Sillero-Rejon[*,**,***]; Olivia Maynard[*,**,***]; José-Angel Ibáñez-Zapata[***]

[*]UK Centre for Tobacco and Alcohol Studies, School of Psychological Science, University of Bristol, UK

[**]MRC Integrative Epidemiology Unit (IEU) at the University of Bristol, UK

[***]Department of Marketing and Market Research, University of Granada, Spain

Enviar correspondencia a:

Carlos Sillero-Rejon

cs16092@bristol.ac.uk

Office 5D11

The Priory Road Complex,

Priory Road, Clifton BS8 1TU

+44 (0) 117 3317495

Resumen

El actual etiquetado de las bebidas alcohólicas pasa desapercibido por los consumidores. A ello se le suma que la legislación europea exime a la industria de las bebidas alcohólicas de incluir advertencias sanitarias en sus envases. Este estudio pretende explorar cómo el tamaño, el diseño y el contenido alcohólico de las bebidas influyen en la atención visual prestada al etiquetado de la graduación alcohólica; y cómo el tamaño y el contenido alcohólico influyen en la atención visual prestada hacia una advertencia sanitaria. Usando un diseño experimental, se monitorizaron los movimientos oculares de 64 participantes mientras visualizaban envases de cerveza con diferente graduación (0.4%, 4.6% vs. 15%). Se midió el número de fijaciones hacia el etiquetado de la graduación alcohólica, manipulando su tamaño y el diseño como factores inter-sujetos. En los envases presentados a la mitad de los participantes se incluyó una advertencia sanitaria, manipulando su tamaño como factor inter-sujeto. Los resultados muestran claras evidencias estadísticas de que el número de fijaciones es superior cuando la graduación alcohólica se muestra con un mayor tamaño y mediante un semáforo nutricional. Asimismo, los resultados relevan un mayor número de fijaciones hacia la advertencia sanitaria cuando esta tiene un tamaño mayor y obtiene diferentes niveles de atención visual dependiendo de la graduación alcohólica del envase. En conclusión, el estudio pone de manifiesto que el actual etiquetado de los envases de bebidas alcohólicas es insuficiente para captar la atención de los consumidores y sugiere que, si se persigue lograr un incremento de la atención prestada, el etiquetado debe mostrarse con un mayor tamaño y con un diseño gráfico.

Palabras clave: Alcohol, Etiquetado, Advertencia, Atención, Eye-tracking

Abstract

Current alcohol labelling is going unnoticed by consumers. In addition to this, EU legislation does not mandate the inclusion of any health warning label on alcohol packaging from the alcohol industry. This study aims to explore how the size and design of alcohol by volume (ABV) labels, along with the alcohol strength presented on these labels, influence visual attention toward them. We also examine how label size and alcohol strength influence visual attention toward a health warning label on alcohol beverages. Using an experimental human laboratory design, we tracked the eye-movements of 64 participants while they were viewing beer beverages with different ABV (0.4%, 4.6% vs. 15%). We measured the number of fixations toward ABV labelling which varied in size and design (text-only vs traffic light). A health warning label was also included on the beer beverages for half of the participants and its size was manipulated as a between-subject factor. Results showed strong evidence that the number of fixations was higher when the ABV labels were larger and used a traffic light system. Likewise, we found a higher number of fixations toward larger health warning labels and differences in visual attention dependant on the ABV content presented. In conclusion, this study indicates that current alcohol labelling is insufficient to draw the attention of consumers and it suggests that future alcohol labelling must be larger and with a graphic design to attract attention.

Key words: Alcohol, Labelling, Health Warning, Attention, Eye-tracking

Introduction

Alcohol is the third leading cause of morbidity and mortality in the European Union (EU), and Europe is the world's heaviest drinking region (Anderson, Møller, Galea, & World Health Organization, 2012). Despite this, EU legislation requires alcohol by volume (ABV) labels but does not mandate the inclusion of any health warning label (Farke, 2011). In Spain, where this study was conducted, ABV labels are usually small, text-only and at the back of the product, fulfilling the minimum requirement from the current legislation (Parlamento Europeo y del Consejo, 2011), with health warning labels being implemented on a voluntary basis (Farke, 2011). Labels are not easily identified as they often take up only a small proportion of space, they do not usually include graphics nor are they updated regularly (Claire Wilkinson & Room, 2009). On the other hand, in other European countries such as the UK, alcohol companies have pledged to label alcohol beverages with responsible drinking information. However, research has found that consumers pay minimal attention to these voluntary labels (Kersbergen & Field, 2017). Previous research has found that larger alcohol labels have the potential to attract more attention (Farke, 2011; Kersbergen & Field, 2017; Truitt et al., 2002) and increasing their salience through graphic designs, which are often not used in Europe (Celia Wilkinson et al., 2009), might attract and maintain attention, as has previously been shown in food labelling research (Graham, Orquin, & Visschers, 2012). It has been suggested that warnings similar to those used on tobacco products should be placed on alcohol containers (Thomson, Vandenberg, & Fitzgerald, 2012) as they are effective in changing consumer behaviour (Hammond, 2011) and in communicating risk (Noar et al., 2015). Recently, Blackwell, Drax, Attwood, Munafò and Maynard (2018) concluded that unit labelling can be improved for a better understanding of alcohol content and suggested the inclusion of health warning labels alongside unit labelling to improve understanding of alcohol harms and discourage risky drinking behaviours.

The present study aims to explore visual attention to a range of ABV labels and a health warning label on alcohol containers. We hypothesise that larger labels (for both ABV and the warning) and the inclusion of graphic design such as a traffic light (for ABV), as compared with text-only information, will increase visual attention. We also hypothesise that visual attention will be greater to higher alcohol strength labels, particularly if they are shown as a traffic light.

Methods

Design

This was an experimental human laboratory study using eye-tracking to measure visual attention to ABV labelling, with size (small vs. large) and design (text vs. traffic light) as between-subject factors and alcohol strength (0.4%, 4.6% vs. 15%) as a within-subject factor. To measure visual attention to the health warning label, a sub-sample, consisting of half of the participants, also viewed a warning label with size (small vs. large) as a between-subject factor and alcohol strength (0.4%, 4.6% vs. 15%) as a within-subject factor.

Material and measures

Stimuli. Four types of ABV labelling stimuli were created to be included on beer bottles as the different combinations of the between-subject factors (design and size): 1) text, small; 2) text, large, 3) traffic light, small and 4) traffic light, large. For text-only stimuli, the ABV information was presented as: ‘ALC. 0.4% VOL.’, ‘ALC. 4.6% VOL.’ or ‘ALC. 15% VOL’. For traffic light stimuli, three different colours were used in addition to the text: green for 0.4%, yellow for 4.6% and red for 15%, also including the words ‘bajo’ (low), ‘medio’ (medium) and ‘alto’ (high) respectively. For half of the participants, beer bottles also included a text-only health warning label: ‘El alcohol daña tu cuerpo y tu mente’ (Alcohol

harms your mind and your body). Two types of health warning labels were created varying in size: 1) small and 2) large. These labels were placed on three different beer bottles and, in turn, they were inserted into three original magazine beer adverts. Thus, a total of 24 original beer bottles were designed to display the combinations of the different stimuli. We present some examples of the stimuli in Figure 1. The Supplementary Material includes more stimuli examples.

INSERT FIGURE 1

Visual attention. Participants' eye movements were recorded using a Tobii T120 device, a 17" screen-based eye-tracking device with a sample rate of 120 Hz. Eye movements were measured by two binocular infra-red cameras underneath the computer screen. We used Tobii Studio to extract the number of fixations to labels.

Other measures. For descriptive purposes, participants also completed the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, Fuente, & Grant, 1993). Using a 10-item scale, we assessed participants' alcohol consumption, drinking behaviour and alcohol-related problems (Cronbach α=0.63).

Procedure

Participants were required to be aged 18–30 and be native Spanish speakers. They were recruited from students and staff at the University of Granada (Spain) and members of the public on a voluntary basis. Eligible participants were invited to take part in a study session. On the day of testing, after reading an information sheet, participants provided written informed consent and completed a short demographic questionnaire for age, gender, marital status, and level of education. Using a pre-determined randomised list, participants were assigned to one of four different groups (to determine the label size and design they would

view) and to either the health warning label subsample or control. Participants then completed the main eye-tracking phase preceded by a nine-point grid calibration. The eye-tracking phase involved asking participants to view an electronic copy of 'Rolling Stone' magazine. A total of 14 pages were shown individually on the 17" TFT, 1280x1024 pixels screen. Three of the 14 pages consisted of the three magazine adverts where the beer bottles were inserted, one for each ABV (0.4%, 4.6%, and 15%). These were presented randomly through the task. To ensure participants engagement on the eye-tracking phase, they were asked to pay as much attention as possible to the content in the magazine as they would participate in a recall activity afterwards. After finishing the eye-tracking phase, participants took part in a recall task similar to the masked-recall exercise from Thomsen & Fulton (2007) and then completed the AUDIT questionnaire.

Statistical Analysis

For the ABV label, a 2 (size: small vs large) x 2 (design: text vs. traffic light) x 3 (strength: 0.4%, 4.6% vs. 15%) mixed-model ANOVA was run for the number of fixations to the label. For the health warning label, a 2 (size: small vs. large) x 3 (strength: 0.4%, 4.6% vs. 15%) mixed-model ANOVA was run for the number of fixations to the label. Recall data were not analysed as it was not part of the study design.

Results

Participants

A total of 64 participants (52% female; age=21; 100% single; 61% secondary school) completed the experiment. Participants reported a mean AUDIT score of 11.17 (SD=3.48), which indicates alcohol use in excess of low-risk guidelines (Anderson, Cremona, Paton,

Turner, & Wallace, 1993; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The subsample of participants who viewed the health warnings consisted of 32 individuals.

Visual attention

Compared to smaller ABV labels, larger labels attracted higher levels of visual attention ($F_{(1,64)}$=41.99, η_p^2=0.41, p<.001). There was also evidence that the use of a traffic light increased the number of fixations ($F_{(1,64)}$=10.50, η_p^2=0.41, p=.002) compared to a text-only design. There was evidence of an interaction between size and design ($F_{(1,64)}$=4.67, η_p^2=0.072, p=.035) such that visual attention was increased when ABV was larger and presented as a traffic light. Finally, there was no clear statistical evidence that the number of fixations differed by the ABV ($F_{(2,64)}$=1.81, η_p^2=0.03, p=.17) or ABV x design ($F_{(2,64)}$=0.85, η_p^2=0.08, p=.54). Results are presented in Table 1.

INSERT TABLE 1 HERE

We observed strong evidence that the size of the health warning label had a positive effect on the number of fixations ($F_{(1,32)}$=15.18, η_p^2=0.34, p<.001). There was also evidence for an effect of ABV ($F_{(2,32)}$=7.52, η_p^2=0.20, p=.001): warnings allocated on the 4.6% ABV alcohol containers obtained the most fixations, followed by 15% and the least for 0.4%.

Discussion

To our knowledge, this is the first study exploring enhanced alcohol labelling in Spain, and one of only a small number worldwide using an objective measure such as eye-tracking. As this study and previous literature have suggested, alcohol labelling in Europe is insufficient as it is often implemented on a voluntary basis by the alcohol industry. Our study shows that in Spain, as in many other European countries where current ABV labelling is small and text-only, these labels attract low levels of attention. Our results show that by increasing the size

and using a traffic light system, ABV labelling attracts more attention. This finding is supported by previous literature (Blackwell et al., 2018; Farke, 2011; Graham et al., 2012; Kersbergen & Field, 2017). In Spain, as in most European countries, alcohol beverages do not have to include any warning labels about the risks of alcohol consumption (Farke, 2011); despite their potential to communicate the harms associated with alcohol intake and discourage risky drinking behaviour among consumers (Blackwell et al., 2018). In terms of the inclusion of these warning labels on alcohol packaging, our data suggest they should be displayed large enough to attract attention.

Previous literature has shown that low-level stimuli characteristics (i.e., bottom-up factors) have the potential to control attention, largely involuntarily (Wedel & Pieters, 2008). This would explain our results: by increasing the size of our stimuli and including a traffic light design, we changed the low-level stimuli characteristics which, as expected, produced an increase in the attention given to them. However, this cannot explain why the health warning label obtained the highest visual attention level on the 4.6% ABV beverage. This suggests that other factors, related to the consumer (i.e., top-down factors), are also playing an important role. For example, previous literature from the tobacco field found that smokers actively avoid paying attention to health warning labels (Maynard et al., 2014). Further research in this direction is needed.

As a preliminary study exploring the impact of alcohol labelling on visual attention, this research has some limitations. First, this study was conducted in Spain, where the systems of using units or standard drinks to display alcohol strength are not used. Therefore, we were not able to examine the impact of these systems on visual attention. Second, we were only able to test for the inclusion of a single health warning label in a sub-sample of the study. Therefore, the results related to this stimulus should be interpreted with caution. Future research should

examine a range of different warnings, including pregnancy and other responsibility statements. There are also inherent limitations regarding the age of participants and the alcohol beverage used in this study. These may limit the extent to which our results can be extrapolated to other populations or alcoholic drinks. Finally, although attention is the first step in processing labels, future research should examine how visual attention is related to actual drinking behaviour.

Notwithstanding these limitations, our study has important implications. As the first study examining Spanish alcohol labelling, our results suggest that current alcohol labelling (small and text-only) goes relatively unnoticed by consumers. Previous research has shown that the Catalan urban environment encourages alcohol consumption and it is characterised by high alcohol availability, so an improvement in regulation is needed to change the social image of alcohol (Villalbí et al., 2018). This is particularly important given the failures in voluntary agreements from the alcohol industry and the recommendation for further regulation for alcohol labelling (European Union Committee, 2015). In this context, Spain has recently made important efforts to develop a new alcohol labelling regulation (Congreso de los Diputados, 2018). Our study provides guidelines for future alcohol label regulation to design labels which actually attract visual attention by being large and using graphic designs such as a traffic light system.

Declaration of Conflicting Interests

The authors declare that they have no competing interests.

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Figure 1. Stimuli examples. On the left, an original 4,6% ABV beer bottle with small ABV label and only text. In the middle, an original 0,4% ABV beer bottle with a large ABV label and as a traffic light. On the right, an original 15% ABV beer bottle with large ABV label and as a traffic light; and a large health warning label.

Table 1

Number of fixations

Alcohol By Volume Label		Total (n = 64)	Size		Design	
			Small (n = 32)	Large (n = 32)	Text (n = 32)	Traffic-Light (n = 32)
Alcohol Strength	**.4%**	.97 (1.48)	.38 (.61)	1.56 (1.83)	.47 (.72)	1.47 (1.85)
	4.6%	.81 (1.18)	.34 (.55)	1.28 (1.44)	.50 (.80)	1.06 (1.44)
	15%	1.16 (1.39)	.34 (.60)	1.97 (1.49)	.97 (1.40)	1.34 (1.38)
	Total	.98 (1.32)	.35 (.59)	1.60 (1.59)	.67 (.97)	1.29 (1.56)
Health Warning Label		**Total** (n = 32)	**Size**			
			Small (n = 16)	**Large** (n = 16)		
Alcohol Strength	**0.4%**	1.81 (1.75)	1.38 (1.50)	2.25 (1.91)		
	4.6%	3.47 (3.34)	1.63 (1.93)	5.31 (3.48)		
	15%	2.41 (2.56)	1.00 (1.26)	3.81 (2.79)		
	Total	2.56 (2.55)	1.33 (1.56)	3.79 (2.72)		

Note. Mean number of fixations to alcohol by volume label regarding their size (small vs. large), design (text vs. traffic light) and strength (0.4%, 4.6% and 15%), and mean number of fixations to health warning label regarding their size (small vs. large) and strength (0.4%, 4.6% and 15%). Standard deviations are given in parentheses.